UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW HAMPSHIRE

OCADO INNOVATION LTD. and OCADO SOLUTIONS LTD., Plaintiffs, v. AUTOSTORE AS and AUTOSTORE SYSTEM INC., Defendants.	Case No. 1:21-cv-00041 **JURY TRIAL DEMANDED**

PATENT INFRINGEMENT COMPLAINT

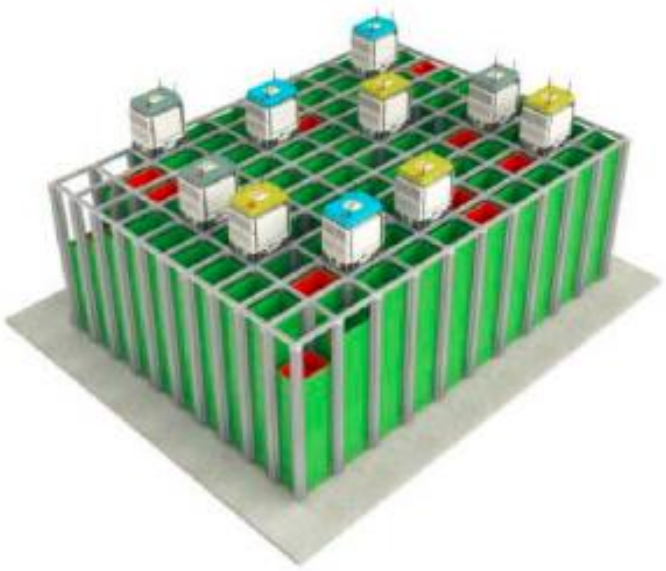
Plaintiffs Ocado Innovation Ltd. ("Ocado Innovation") and Ocado Solutions Ltd. ("Ocado Solutions"; together, "Ocado" or "Plaintiffs") allege the following, on information and belief, in support of their Complaint against Defendants AutoStore AS and AutoStore System Inc. (together, "AutoStore" or "Defendants"):

INTRODUCTION

1. Defendants, and Defendants' business partners and customers, have infringed and continue to infringe several of Ocado's U.S. patents, which relate to inventions that Ocado developed in connection with its successful cubic automated storage and retrieval system ("Cubic AS/RS"). Ocado's innovative Cubic AS/RS is called the Hive, and it is part of the Ocado Smart Platform ("OSP")—an end-to-end solution for grocery order placement, fulfillment, and delivery. OSP includes (i) an Internet-based ordering system, (ii) Customer Fulfillment Centers ("CFCs," which include the Hive), and (iii) last-mile management for quick delivery of orders.

2. Cubic AS/RS provides a high-density storage cube, with robots that move along the top of the cube, retrieve containers that store inventory items up vertically from a storage

column, and deliver them to picking stations for assembly of customer orders. Cubic AS/RS is depicted in the following graphic:



3. Cubic AS/RS stands apart from other forms of automated order management—*e.g.*, conveyor belt systems and robotic cranes that select items from warehouse shelves—because, among other things, Cubic AS/RS provides (i) high storage density (and attendant cost savings), and (ii) extremely quick, safe, and accurate order fulfillment. The robots moving on top of a storage cube act at the direction of "air traffic control" technology that optimizes their travel paths, which enables them to store and retrieve items rapidly. Merchants that experience high throughput—*e.g.*, online grocery merchants that need to handle thousands of orders in a matter of hours—are increasingly turning to Cubic AS/RS as a solution, especially as online shopping increases dramatically.

4. Ocado's innovative Cubic AS/RS—the Hive component of OSP—illustrates the maxim that necessity is the mother of invention. As one of the first dedicated online grocery businesses, Ocado needed to find ways to solve unique problems encountered by an online grocery business. For example, an online grocery business must (i) manage extremely high customer order

volume—in terms of both the number of orders and the size of any particular order—which sometimes requires fulfillment and shipment of thousands of orders in a matter of hours, and (ii) reliably store, handle, and deliver frozen, refrigerated, and other perishable items. When Ocado started its online grocery business in 2002, Ocado therefore sought to automate order processing as much as possible so its fulfillment of customer orders could be rapid and accurate.

5. With respect to grocery order fulfillment, Ocado evaluated, but ultimately rejected, "off the shelf" automated storage and retrieval systems, including Defendants' Red Line system, which has not materially improved since 2005. The Red Line system utilizes cantilever robots (depicted in the image below), which have a main body that stores driving and lifting mechanisms and electronics, and a cantilevered "arm" to lift storage containers (sometimes called bins or totes) out of the storage cube:

6. Ocado found the Red Line system unsuitable for a grocery business for numerous reasons, and the following are four examples. *First*, cantilever robots are limited in how they can move on the top of the storage cube because of their shape (the cantilever "arm" obstructs the passage of other robots on adjacent paths). *Second*, the Red Line system's robots run on tracks that further compromise mobility. In the image above, for example, the Red Line robot is depicted

on "single-single" rails, which means the robots cannot pass immediately next to each other in any direction because their wheels would collide on the track. *Third*, Red Line robots are slow and energy inefficient because of the cantilever design. The wheels that lie between the main body and cantilever "arm" create a fulcrum around which the entire body of the robot may pivot (and fall over). Accordingly, the main body of the robot needs to counteract the tipping effect, and that negatively affects the speed and energy efficiency of the robot. *Fourth*, Red Line's robots often would stack storage containers such that a container stuck out of the top of the storage grid. That created an obstacle to robot travel, and reduced the available routes for robots to take (which, in turn, reduced system efficiency).

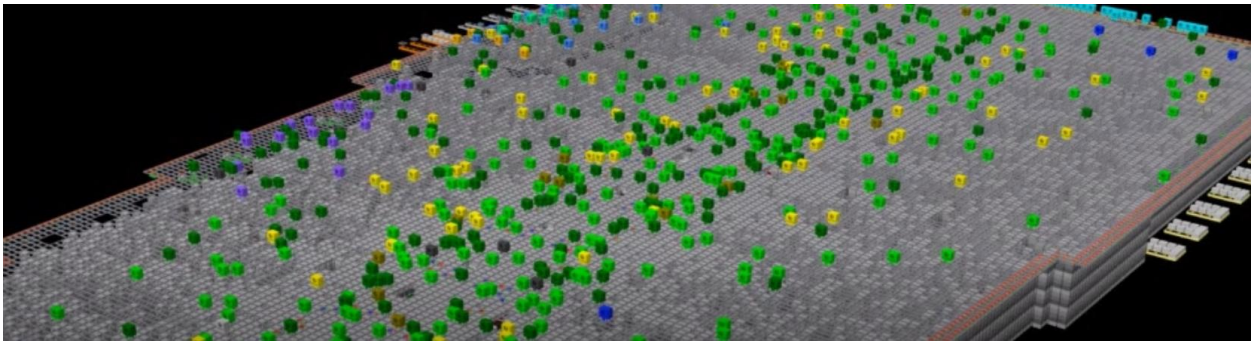
7. Disappointed with "off the shelf" options, Ocado proposed that AutoStore and Ocado work together to reimagine Cubic AS/RS and implement several of Ocado's ideas to improve the system. AutoStore initially engaged in discussions—meeting with Ocado representatives in Norway, travelling to one of Ocado's automated warehouses in the United Kingdom, and expressing interest in Ocado's innovative set-up—but then AutoStore abruptly cut off discussions with Ocado, claiming that the partnership would be inconsistent with AutoStore's business model. Ocado therefore decided to innovate on its own, working with external engineering firms to make Ocado's inventions a reality.

8. Ocado's invention was a complete reimagining of AutoStore's pre-existing Cubic AS/RS. Ocado's reimagining made Cubic AS/RS capable of use for management of grocery orders in several respects, but one particularly important improvement was dispensing with cantilever robots. Ocado's robots occupy a single space on the storage grid and they lift a storage bin up inside a cavity in the robot's body. That technology increases efficiency because, among other reasons, robots are able to pass on adjacent grid squares in two directions. Additionally, the wheels of an OSP robot run on "double-double" rails, which give the robots the ability to pass

immediately next to each other on the same rail in the X-direction and Y-direction. A video of OSP's robots in operation is available on YouTube,[1] and the following is a still image from that video:

9. Because Ocado's single-space robots have greater freedom to move on top of the grid, the robots can be managed by more complex "air traffic control" software, which has a much greater probability of identifying an available traffic route that will be most efficient for item storage and retrieval (*e.g.*, relative to the constrained movement of Defendants' cantilevered robots). Ocado's robots can travel at a speed of up to four meters per second, while coordinating with a central controller that uses Ocado's route optimization technology, and the system can complete the pick of a 50-item grocery order in fewer than five minutes. Ocado's Hive is extremely complex, and it can span the area of several football fields, as shown in the following rendering of a real installation:

[1] Tech Insider, *Inside a Warehouse Where Thousands of Robots Pack Groceries*, YouTube (May 9, 2018), https://www.youtube.com/watch?v=4DKrcpa8Z_E.



10. To date, Ocado has invested more than $1 billion to design and develop OSP, and Ocado continues to innovate, spending hundreds of millions of dollars each year on R&D for new technologies to be implemented with OSP—investing about $164 million in 2019 alone.[2] In part because of these innovations, Ocado's online grocery business has thrived.

11. Although Ocado originally developed the Hive to support its own online grocery business, the value of the Hive—and OSP as an overall end-to-end solution—has been recognized by others, and Ocado has launched an independently successful business selling OSP technologies to other merchants. In 2018, for example, Ocado entered into an exclusive grocery partnership with The Kroger Company ("Kroger")—the United States' largest grocery supermarket chain and second largest retailer (after Walmart)—to construct up to 21 CFCs across the United States. Those CFCs, which utilize Ocado's Cubic AS/RS innovations (including the patented inventions at issue in this Complaint), will allow Kroger to expand its geographic footprint, and the companies already have announced installations in (i) Ohio;[3] (ii) Central Florida and the Mid-Atlantic region;[4]

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[2] *See also* Ocado Group plc 2019 Annual Report at 7 (May 13, 2020) (Ex. 1). This figure was reported in Ocado's annual report in GBP, and has been converted to USD using the Bank of England's reported daily spot rate for December 31, 2019 (£1 = $1.3210).

[3] The Kroger Company, *Kroger and Ocado Identify Site of America's First High-Tech Customer Fulfillment Center* (Nov. 19, 2018), http://ir.kroger.com/CorporateProfile/press-releases/press-release/2018/Kroger-and-Ocado-Identify-Site-of-Americas-First-High-Tech-Customer-Fulfillment-Center/default.aspx (Ex. 2).

[4] The Kroger Company, *Kroger and Ocado Name Central Florida City Location of Second High-Tech Customer Fulfillment Center* (Mar. 19, 2019), http://ir.kroger.com/CorporateProfile/press-

(iii) Georgia;[5] (iv) Dallas, Texas;[6] (v) Wisconsin;[7] (vi) Maryland;[8] (vii) the Great Lakes, Pacific Northwest, and Western regions;[9] and (viii) Michigan.[10] The goal of the partnership is to provide online grocery shopping to consumers throughout all regions of the United States, enabling both quick delivery to customers and easy pickup by customers.

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releases/press-release/2019/Kroger-and-Ocado-Name-Central-Florida-City-Location-of-Second-High-Tech-Customer-Fulfillment-Center/default.aspx (Ex. 3); The Kroger Company, *Kroger and Ocado Announce Two Additional Sites for High-Tech Customer Fulfillment Centers* (Feb. 19, 2019), http://ir.kroger.com/CorporateProfile/press-releases/press-release/2019/Kroger-and-Ocado-Announce-Two-Additional-Sites-for-High-Tech-Customer-Fulfillment-Centers/default.aspx (Ex. 4).

[5] The Kroger Company, *Kroger and Ocado Name Georgia Location of High-Tech Customer Fulfillment Center* (July 11, 2019), http://ir.kroger.com/CorporateProfile/press-releases/press-release/2019/Kroger-and-Ocado-Name-Georgia-Location-of-High-Tech-Customer-Fulfillment-Center/default.aspx (Ex. 5).

[6] The Kroger Company, *Kroger and Ocado Name Dallas Location of Fifth High-Tech Customer Fulfillment Center* (Sept. 12, 2019), http://ir.kroger.com/CorporateProfile/press-releases/press-release/2019/Kroger-and-Ocado-Name-Dallas-Location-of-Fifth-High-Tech-Customer-Fulfillment-Center/default.aspx (Ex. 6).

[7] The Kroger Company, *Kroger and Ocado Bringing 6th High-Tech Customer Fulfillment Center to Pleasant Prairie, Wisconsin* (Nov. 14, 2019), http://ir.kroger.com/CorporateProfile/press-releases/press-release/2019/Kroger-and-Ocado-Bringing-6th-High-Tech-Customer-Fulfillment-Center-to-Pleasant-Prairie-Wisconsin/default.aspx (Ex. 7).

[8] The Kroger Company, *Kroger and Ocado to Operate High-Tech Customer Fulfillment Center in Frederick, Maryland* (Jan. 23, 2020), http://ir.kroger.com/CorporateProfile/press-releases/press-release/2020/Kroger-and-Ocado-to-Operate-High-Tech-Customer-Fulfillment-Center-in-Frederick-Maryland/default.aspx (Ex. 8).

[9] The Kroger Company, *Kroger and Ocado Announce Three Additional Regions for High-Tech Customer Fulfillment Centers* (June 5, 2020), http://ir.kroger.com/CorporateProfile/press-releases/press-release/2020/Kroger-and-Ocado-Announce-Three-Additional-Regions-for-High-Tech-Customer-Fulfillment-Centers/default.aspx (Ex. 9).

[10] The Kroger Company, *Kroger and Ocado Announce Locations of High-Tech Customer Fulfillment Center in Romulus, Michigan* (Sept. 28, 2020), http://ir.kroger.com/CorporateProfile/press-releases/press-release/2020/Kroger-and-Ocado-Announce-Location-of-High-Tech-Customer-Fulfillment-Center-in-Romulus-Michigan/default.aspx (Ex. 10).

12. The U.S. Patent and Trademark Office has issued several patents to Ocado related to OSP's innovations generally, and the Hive in particular. The inventions at issue in this Complaint are claimed in U.S. Patent Nos. 9,796,080 ("'080 Patent"), 10,901,404 ("'404 Patent"), and 10,913,602 ("'602 Patent") (collectively, the "Asserted Patents"). The inventions claimed in each Asserted Patent pertain to Cubic AS/RS improvements, and those inventions are particularly, but not exclusively, useful for management of online grocery orders. As explained below, Defendants have used and continue to use those patented inventions as part of their opportunistic shift in business focus—from non-grocery merchants to online grocers at a time when online grocery shopping is growing significantly.

13. In contrast to Ocado, Defendants chose not to invest heavily in innovation, and instead continued to sell the legacy Red Line system. In January 2017, Defendants' founders decided to "cash out," and AutoStore was sold to the private equity firm EQT AB. In July 2019, AutoStore was again sold to another private equity firm, Thomas H. Lee Partners ("THL"). Under pressure to produce profit—and having passed up the opportunity to work in partnership with Ocado—AutoStore decided to copy Ocado's Cubic AS/RS technology and pass it off as AutoStore's own, particularly to target online grocery merchants.

14. In 2019, the same year as AutoStore's sale from EQT to THL, AutoStore launched a "new" system called Black Line, which is remarkably similar to Ocado's Hive and utilizes Ocado's patented technology (as set forth in the recently allowed claims of Ocado's '602 Patent). The Black Line robots, which are also referred to by generation, occupy substantially a single grid space on "double-double" rails, as depicted in the image below:

15. According to Defendants, "B1 is a slimmed down, lighter robot with a Cavity design,"[11] and B1 provides "high-volume throughput becoming ultra-optimized to meet the various needs of companies across multiple industries. State-of-the-art improvements to the robot and workstation modules provide companies the tools they need to provide 24/7 service."[12] As stated by one of Defendants' business partners, Bastian Solutions ("Bastian"), in marketing literature that is distributed on Defendants' behalf: "A modified 'double-double' grid, with double tracks in both directions, permits the robots to pass side-by-side in both the x and y directions. Combined with the robot's smaller footprint, the new grid can accept more robots and operate efficiently in high density configurations." Bastian also touts the real-world benefits of the Black Line system, explaining that Red Line is suitable only "for customers with throughput requirements of up to 350 bins per hour per port," and "the new B1 robot, in combination with the

[11] AutoStore, *B1*, https://autostoresystem.com/b1/ (Ex. 11).

[12] AutoStore, *AutoStore Voted as a MHPN Reader's Choice Product of the Year*, https://autostoresystem.com/news/autostore-voted-readers-choice-product-of-the-year/ (Ex. 12).

new [pick station] can achieve up to 650 bins per hour per port—almost doubling today's maximum throughput level."[13]

16. In late 2020, Defendants introduced a new "software suite for its cube based order fulfillment system that increases robot productivity and efficiency by up to 40%," which is called the Router.[14] The "new" Router—like the "new" Black Line system—infringes Ocado's patented technology (as set forth in Ocado's '404 Patent).

17. According to Defendants' press release: "Router utilizes sophisticated computer algorithms to continuously calculate and recalculate in real time the most efficient path for AutoStore robots to move and deliver orders inside the company's high-density grid system. Every second, the advanced software analyzes and dynamically adapts to operational changes, accelerating the fulfillment process and maintaining a continuously optimized flow of order movement. In this way the system is able to process and adapt to continuously changing events happening outside the grid, such as new orders coming in, order cancellations, and movement of fulfillment personnel."[15]

18. Defendants stated that the Router "can be implemented in any AutoStore system . . . and by purchasing this new software, users can potentially improve total system throughput by

[13] Derek Cribley, *AutoStore Black Line: Your Questions Answered*, Bastian Solutions: The Material Handling Blog (Jan. 15, 2019), https://www.bastiansolutions.com/blog/autostore-black-line-your-questions-answered/ (Ex. 13).

[14] AutoStore, *AutoStore Introduces Router: Game-changing Productivity Software to Solve Order Fulfillment Challenges for eCommerce*, GlobeNewswire (Sept. 29, 2020), https://www.globenewswire.com/news-release/2020/09/29/2100400/0/en/AutoStore-Introduces-Router-Game-changing-Productivity-Software-to-Solve-order-fulfillment-challenges-for-eCommerce.html (Ex. 14).

[15] *Id.*

up to 4x." Defendants called Router "the biggest development in AutoStore history in years."[16] In the launch video that Defendants released for the Router, they called the new product "the essence of [AutoStore's] technology," which is necessary to "unlock the full potential of AutoStore" and "one of the biggest milestones in AutoStore history."[17] In that same video, Defendants emphasized that "incremental improvements are simply not enough," and the Router was necessary so Defendants could "re-invent themselves in order to grow" because "software has always been the silent piece behind the scenes that makes everything happen."[18] Putting it in no uncertain terms, Defendants' Chief Product Officer stated that Router "positions AutoStore as the ultimate choice when it comes to eGrocery fulfillment."[19]

19. Finally, along with the launch of the Router, Defendants began to publish marketing materials specifically targeted to online grocery merchants. As noted above, Defendants historically had focused on non-grocery retail customers, and Defendants' shift appears to be motivated by growing demand for grocery delivery in 2020. Like the Black Line system and Router, Defendants' shift in focus to online grocery merchants depends on infringement of Ocado's patented technologies—which were optimized for grocery application—such as the "tote-in-tote" technology claimed in Ocado's '080 Patent.

20. For example, in October 2020, Defendants released new marketing materials directed specifically to grocery customers.[20] As presented in the October 2020 marketing material,

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[16] *Id.*

[17] AutoStore, *AutoStore | Router™ Launch*, YouTube (Sept. 29, 2020), https://youtu.be/L8qNU6INf40.

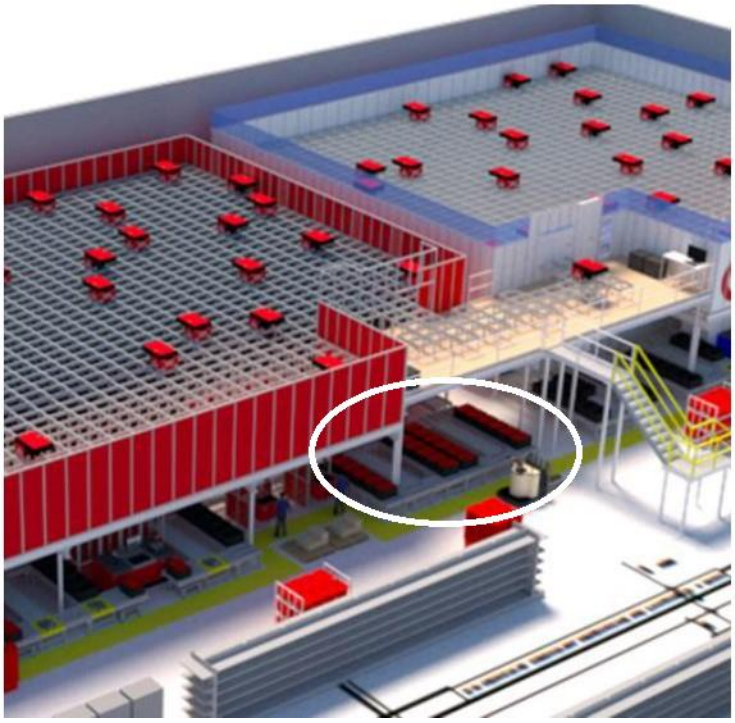
[18] *Id.*

[19] *Id.*

[20] AutoStore, *CS Disruption Series* (Oct. 2020) (Ex. 15).

Defendants appear to be using, or at least offering, Ocado's patented tote-in-tote technology, which was specifically designed to meet challenges presented by the fulfillment of grocery orders. That technology allows for completed or partially completed customer orders to be stored in delivery containers that are nested within storage containers and then sent back into main Cubic AS/RS storage grid, instead of moving through a separate order processing, sorting, and storage system. Delivery totes are then removed from the storage grid for delivery when they are ready for dispatch.

21. Ocado's tote-in-tote invention is extremely valuable for high throughput businesses like an online grocery business, and the invention (i) allows a grocery merchant to store customer orders until they are ready for pick up or delivery in a more efficient and cost-effective manner, and (ii) eliminates the equipment and cost associated with a separate dispatch processing, sorting, and storing system in the warehouse. Defendants' use of Ocado's "tote-in-tote" technology is illustrated in the graphic below, which Defendants included in their October 2020 marketing material directed to online grocery merchants (white circle added for identification of nested delivery and storage containers, as claimed in Ocado's patent). Defendants' use of, or at least offer to sell, Ocado's "tote-in-tote" technology infringes the '080 Patent.



22. Defendants' shift in business strategy, and increasingly brazen infringement of Ocado's patents to achieve that shift, compelled Ocado to bring this action.[21] Ocado seeks, among other things, permanent injunctive relief, lost profits, and other damages sufficient to remedy and prevent Defendants' willful infringement of Ocado's patented technology.

[21] AutoStore filed two separate patent infringement actions against Ocado in October 2020. AutoStore filed the first action, which is stayed, in the Eastern District of Virginia. *AutoStore Tech. AS* v. *Ocado Cent. Servs. Ltd., Ocado Group plc, Ocado Innovation Ltd., Ocado Operating Ltd., Ocado Sols. Ltd., & Ocado Sols. USA Inc.*, No. 2:20-cv-00494 (E.D. Va.). The second action is pending before the U.S. International Trade Commission. *In re Certain Automated Storage and Retrieval Sys., Robots, & Components Thereof*, Investigation No. 337-TA-1228. Ocado has sought *inter partes* review or post-grant review from the U.S. Patent and Trademark Office of all patents asserted by AutoStore in those actions. Ocado filed the present action in the District of New Hampshire because the claims presented here are entirely different from the claims in the other actions. Moreover, following the Supreme Court's decision in *TC Heartland LLC* v. *Kraft Foods Group Brands LLC*, 137 S. Ct. 1514 (2017), Ocado could bring its patent infringement claims only in AutoStore's state of incorporation or a district where AutoStore has a regular and established place of business and has committed acts of infringement—*i.e.*, the District of New Hampshire.

THE PARTIES

23. Plaintiff Ocado Solutions is an entity organized under the laws of the United Kingdom, with its principal place of business located at Buildings One & Two, Trident Place, Mosquito Way, Hatfield, Hertfordshire, AL10 9UL, United Kingdom. Ocado Solutions is a wholly owned subsidiary of Ocado Group plc, and Ocado Solutions is the subsidiary that conducts Ocado's global business of selling OSP technology to other merchants. Ocado Solutions, for example, is the counterparty to the Ocado-Kroger partnership agreements, and Ocado Solutions receives payments made by Kroger to Ocado under those agreements. Ocado Solutions is the exclusive licensee of the Asserted Patents.

24. Plaintiff Ocado Innovation is an entity organized under the laws of the United Kingdom, with its principal place of business located at Buildings One & Two, Trident Place, Mosquito Way, Hatfield, Hertfordshire, AL10 9UL, United Kingdom. Ocado Innovation is the assignee of the Asserted Patents, and it is a wholly owned subsidiary of Ocado Group plc. Ocado Innovation has exclusively licensed the Asserted Patents to Ocado Solutions.

25. Defendant AutoStore AS is a Norwegian corporation with its headquarters and principal place of business at Stokkastrandvegen 85, 5578 Nedre Vats, Norway. On information and belief, AutoStore AS markets and sells AutoStore's Red Line and Black Line systems globally.

26. Defendant AutoStore System Inc. is a corporation organized under the laws of Delaware, with its headquarters and principal place of business at 3 Corporate Park Drive, Unit 1, Derry, New Hampshire 03038. On information and belief, AutoStore System Inc. is a wholly owned subsidiary of AutoStore AS, and AutoStore System Inc., among other things, (i) markets and sells AutoStore's Red Line and Black Line systems to customers and business partners in the United States, and (ii) provides design, engineering, training, and support (including installation, testing, and repair) to customers and business partners throughout the United States.

JURISDICTION AND VENUE

27. This Court has subject matter jurisdiction over this patent infringement action, brought under Title 35 of the United States Code, pursuant to 28 U.S.C. §§ 1331 and 1338(a).

28. This Court has personal jurisdiction over Defendant AutoStore System Inc. because its headquarters and principal place of business are located in Derry, New Hampshire. AutoStore System Inc. has, at all relevant times, acted as an agent for, and at the direction of, AutoStore AS.

29. Personal jurisdiction also exists over AutoStore AS, under New Hampshire's long-arm statute, N.H. Rev. Stat. § 293-A:15.10, because AutoStore AS has its U.S. principal place of business in New Hampshire, and at least through AutoStore System Inc., AutoStore AS (i) has committed acts of infringement in this District, and (ii) advertises, markets, offers for sale, imports, distributes, or sells infringing products in this District.

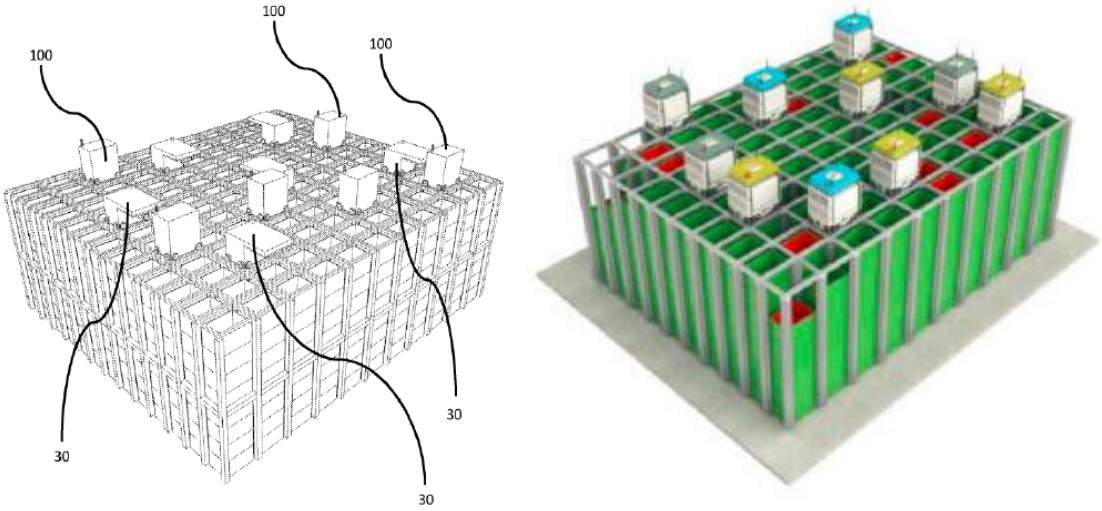
30. Venue is proper in this District, pursuant to 28 U.S.C. § 1400(b), because AutoStore System Inc. has its headquarters in New Hampshire and has committed acts of infringement in this District. AutoStore AS is a foreign corporation, and therefore venue is proper in this District.

THE ASSERTED PATENTS

31. Historically, to fulfill customer orders, retail grocery employees would pick items off shelves in warehouses with large amounts of empty space. OSP's Hive, a reimagined Cubic AS/RS, is an efficient and cost-effective alternative, which leverages inventive combinations of high-density, modular storage grids with robotic elements that can rapidly lift and transport storage bins to order-fulfillment stations for handling by other robotics equipment or employees.

32. Unlike traditional product storage and retrieval systems, Cubic AS/RS—of which Ocado's Hive is an example—are formed by vertical support beams, the tops of which are connected by rails to create an X/Y grid. The grid of Ocado's Hive has two sets of rails—with the

first set running perpendicular to the second set—and each rail contains two separate tracks (the "double-double" rails discussed above in paragraphs 8, 14–15). The structure consists of rectangular columns in which storage containers are stacked, which, among other things, eliminates aisles and maximizes storage density. The figures below are an illustrative example of the structure of the system.



33. The storage containers are accessed from above by robots that travel laterally across the grid and are equipped with a lifting and gripping device, which enables them to reach down into the vertical columns and retrieve containers. The containers are then lifted into the robots' container-receiving space—which, in the robots depicted above, is a cavity inside the outer housing of the robot. The robots then transport the storage bins across the grid and deliver them to a human operator or other robotics equipment at a picking station.

34. OSP robots communicate with a central controller using advanced patented connectivity technology. Among other functions, the control software (as part of the overall control system) plans and reserves the most efficient route for the robots to reach and retrieve the target storage container. The system provides specific collision prevention capabilities, which authorizes or restricts robot movement across the grid based on several considerations. Once the robot has retrieved the target storage bin, the robot transports it across the grid and lowers it to a

designated hand-off point. The robot can then release the bin and continue with its next task. The storage bin moves through buffering locations until a human operator or other robotics equipment is ready to transfer the inventory items in the storage bin into a delivery container. At this point, the storage bin (containing inventory items) is moved into the primary position in the operator's picking station. This allows the storage and retrieval robots and the picking station operators to work independently, and makes the picking process more efficient. After inventory in the storage bin has been moved into the delivery container—that is nested in a storage container—the storage bin moves to a position where it is retrieved by a robot and returned to an appropriate storage location in the Hive. This operation is repeated until all the inventory items for an order have been retrieved from storage bins and transferred into the nested delivery container. At this point, the nested storage-delivery container is moved to a location where it can be retrieved by a robot and stored in the Hive until the order is ready for dispatch to a customer.

35. All of the features described above enhance the efficiency of Cubic AS/RS and create substantial value for grocery and other merchants, and several of the features described above are claimed in the Asserted Patents.

36. Pursuant to this district's Supplemental Rules for Patent Cases § 2.1(a)(2), below, Ocado describes an illustrative claim for each of the Asserted Patents.

A. The '602 Patent

37. On February 9, 2021, the United States Patent and Trademark Office issued U.S. Patent No. 10,913,602, entitled "Apparatus for Retrieving Units from a Storage System." A copy of the '602 Patent is attached hereto as Exhibit 16.

38. The '602 Patent describes a more compact load-handling device (*e.g.*, a retrieval and transportation robot), configured to have a reduced footprint on the storage grid on which the

device travels—*i.e.*, a robot that "occupies substantially only a single grid space in the storage system" (a "Single Space Bot" or "SSB"). (Ex. 16 ¶ 0026.)

39. The reduced footprint of the Single Space Bot is accomplished by utilizing a centrally located cavity accessible from the undercarriage of the robot (which acts as the container-receiving space) and locating bulky components *above* rather than to the side of the cavity. In contrast, earlier robots—*e.g.*, cantilevered robots—occupied two spaces because the container was held in one of the spaces adjacent to the robot. Similarly, prior art cavity robots utilized substantially more than a single grid space because bulky components were placed to the side of the cavity. In contrast to those prior art robots, the SSB claimed in the '602 Patent "will not obstruct [another robot] occupying or traversing an adjacent grid space in the X-direction and will not obstruct [another robot] occupying or traversing an adjacent grid space in the Y-direction." (*Id.*, Claim 1.)

40. The invention of the '602 Patent does not require that the robot strictly occupy only a single grid space, and as stated in the patent, the robot occupies substantially a single grid space so that a first robot can pass another robot in at least one X-direction and at least one Y-direction using adjacent grid spaces. That feature enhances the performance of the robots with respect to, *inter alia*, speed of operation, battery life, reliability, lifting capacity, and stability, as explained in the patent.

41. Exemplary Claim 1 of the '602 Patent claims:

> 1. A storage system comprising:
>
> a first set of parallel rails or tracks extending in an X-direction, and a second set of parallel rails or tracks extending in a Y-direction transverse to the first set of rails or tracks in a substantially horizontal plane to form a grid pattern having a plurality of grid spaces;
>
> a plurality of stacks of containers located beneath the first and second sets of rails or tracks, and arranged such that each stack is located within a footprint of a single grid space; and

a multiplicity of load handling devices, wherein each load handling device includes:

a wheel assembly having a first set of wheels for engaging with the first set of rails or tracks to guide device movement in the X-direction and a second set of wheels for engaging with the second set of rails or tracks to guide device movement in the Y-direction, such that each load handling device is configured to selectively move laterally in the X- and Y-directions, above the plurality of stacks on the first and second sets of rails or tracks,

a container-receiving space arranged to be located above the first and second sets of rails or tracks for accommodating a container when received from the plurality of stacks,

a lifting device arranged to lift the container from a stack of the plurality of stacks into the container-receiving space, and

an external housing that is shaped substantially in a cuboid having two sides facing the X-direction, two sides facing the Y-direction, and a top facing a Z-direction, such that the external housing substantially encloses the container-receiving space from above and on all four sides of the load handling device, a side of the external housing facing the Y-direction extending no further, in the Y-direction, than the first set of wheels on that side of the load handling device, and a side of the external housing facing the X-direction extending no further, in the X-direction, than the second set of wheels on that side of the load handling device, such that a load handling device of the multiplicity of load handling devices will occupy a grid space and will not obstruct a load handling device of the multiplicity of load handling devices occupying or traversing an adjacent grid space in the X-direction and will not obstruct a load handling device occupying or traversing an adjacent grid space in the Y-direction.

B. The ’404 Patent

42. On January 26, 2021, the United States Patent and Trademark Office issued U.S. Patent No. 10,901,404, entitled “Methods, Systems and Apparatus for Controlling Movement of Transporting Devices.” A copy of the ’404 Patent is attached hereto as Exhibit 17.

43. The ’404 Patent teaches a system and method for controlling the movement of robots on the storage grid. (*See* Ex. 17, col. 1, ll. 20–26.) As explained above, Ocado’s Cubic AS/RS includes several robots that operate on the grid simultaneously. For the robots to do so

rapidly and efficiently, there must be a control unit configured to, among other things, plan and reserve routes for the robots to travel safely across the grid, and to dynamically re-plan routes based on developments as the system operates.

44. The ’404 Patent teaches a system containing several modules, or “units,” each controlling a different process, and those modules interact to optimize robot performance on the storage grid. These modules include:

a. A Movement Optimization Unit. Rather than having each robot make “decisions” about its movements, the movement optimization unit determines for each robot an optimal route from one grid location to another.

b. A Reservation Unit. The reservation unit reserves a determined route for each robot such that no two robots have locations on the storage grid that would cause them to overlap at the same time. This takes into account that optimized routes for different robots should not conflict.

c. A Clearance Unit. The clearance unit is configured to provide a clearance instruction for each robot, and that clearance instruction will be executed by a robot at a future time. In other words, the clearance unit is configured to send instructions for movement, and to generally provide those instructions in anticipation of future movements. (*See id.* col. 2, ll. 22–28.)

45. The ’404 Patent also teaches and claims advantageous ways in which the modules identified above can interact and operate. For example, the system can be implemented with (i) a configurable time between the sending of a clearance instruction and its execution (*e.g.*, from virtually no time between provision and execution to a longer, pre-configured time); (ii) a clearance unit that withholds clearance instructions in response to status reports from robots; and (iii) a clearance unit and/or path optimization unit that dynamically re-plans routes (*e.g.*, if a

clearance instruction is withheld based on status reports from robots, the route can be dynamically re-planned in real time). The '404 Patent also teaches and claims numerous other optional and advantageous variations, which optimize the performance of busy robots as they quickly move around the storage grid to store, retrieve, move, and deliver items for customer orders.

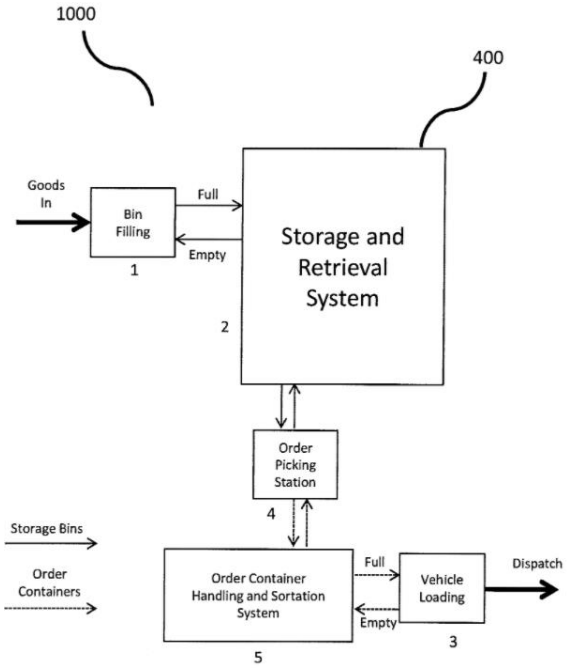
46. Exemplary Claims 6 and 9 of the '404 Patent are set forth below. Those claims "depend from" Claim 1, and therefore include all of the elements of Claim 1:

> 1. A system for controlling movement of transporting devices arranged to transport containers, the containers being stored in stacks arranged in a facility, the facility having pathways arranged in a grid-like structure above the stacks, the transporting devices being configured to operate on the grid-like structure, the system comprising:
>
> a movement optimisation unit configured to determine a route of a transporting device from one location on a grid-like structure to another location on the grid-like structure for each transporting device;
>
> a reservation unit configured to reserve a path on the grid-like structure for each transporting device based on the determined route, wherein the path reserved for each transporting device is provided such that no two transporting devices have locations on the grid-like structure which would cause transporting devices to overlap at a same time; and
>
> a clearance unit configured to provide a clearance instruction for each transporting device to traverse a portion of the reserved path, wherein the clearance instruction is provided for execution by a control unit on each transporting device at a future start time.
>
> * * *
>
> 6. The system according to Claim 1, wherein the clearance unit is configured to grant or withhold providing clearance for a transporting device to traverse a portion of the reserved path in response to a status report received from each transporting device.
>
> * * *
>
> 9. The system according to Claim 1, wherein at least one of the clearance unit, and the movement optimisation unit is configured to dynamically re-plan a route of at least one transporting device.

C. The ’080 Patent

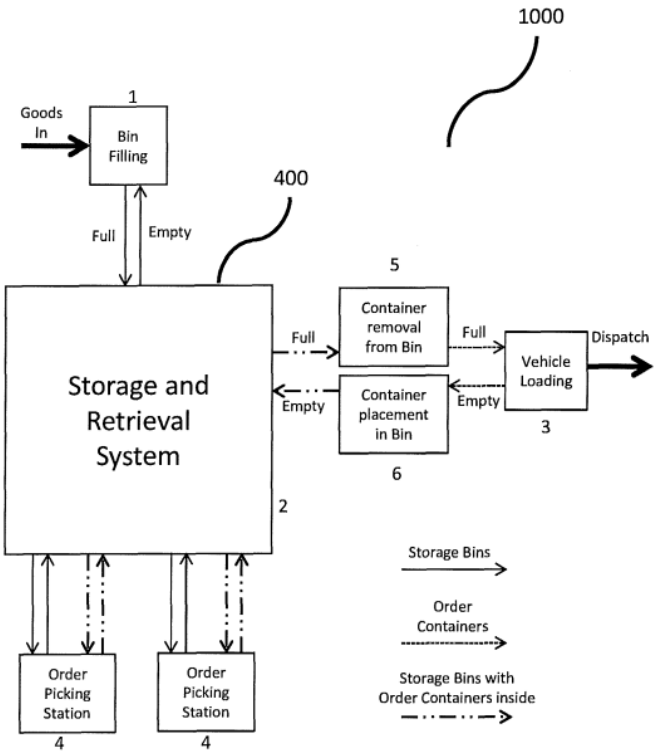
47. On October 24, 2017, the United States Patent and Trademark Office issued U.S. Patent No. 9,796,080, entitled “Systems and Methods for Order Processing.” A copy of the ’080 Patent is attached hereto as Exhibit 18.

48. The ’080 Patent discloses systems and methods to improve order processing by optimizing the picking, storing, and delivering of customer orders. In earlier systems, as seen in the figure below, items that were picked from storage bins were placed into designated delivery bins. After the delivery bins were filled, they would be placed in a separate order handling and sortation system until ready to be loaded and dispatched for delivery to the customer. (Ex. 18, Figure 1.) On a large scale, this system is inefficient and often requires extensive conveyor systems for sorting and transporting the delivery bins. (*Id.*, col. 1, ll. 46–55.) Accordingly, it required more floor space in the CFC, as well as other investment, including lighting, heating or air conditioning, and machine maintenance. The flow of the prior art system is depicted in the following figure from the ’080 Patent:



49. The ’080 Patent claims a system and method for storing delivery bins within the Cubic AS/RS storage grid, which eliminates the need for a separate order handling and sortation system, as well as the conveyor systems required to connect the order handling and sortation system with the picking stations.

50. In the system described in the ’080 Patent, a human operator at the picking station takes items from storage bins and places them into delivery containers that are nested in storage bins (in the figure below, “bins” refers to storage bins and “containers” refers to delivery containers). Once the operator has completed picking the order, the nested bin-container combination is then placed back in the Cubic AS/RS system for storage (depicted by the dotted arrows) awaiting dispatch. When all of the delivery containers that are scheduled to ship together are ready, the storage bins comprising the required delivery containers are taken from the Cubic AS/RS system, the delivery containers removed from their respective storage bins, and loaded onto a vehicle for delivery. (*See id.*, Figure 7.) Once the delivery containers, containing customer orders, have been removed from their respective storage bins, replacement empty delivery containers are placed in the storage bins and the new nested container-bin combination returned to the storage unit until moved to a pick station to begin compilation of another customer order. This utilizes the existing Cubic AS/RS infrastructure to store customer deliveries in nested bin-container combinations and empty bin-container combinations and eliminates the need for a separate order handling and sortation system:



51. Exemplary Claim 23 of the ’080 Patent provides:

23. A system for managing storage and retrieval of containers, comprising:

a storage and retrieval system including:

a structural framework defining a grid of storage locations for receiving a plurality of containers;

a plurality of robotic load handlers each configured to access any one of the storage locations in the grid of the structural framework; and

a controller configured to control at least one robotic handler in transporting at least one of the plurality of containers to/from any one of the storage locations in the grid,

wherein the plurality of containers includes storage containers configured to store products to be ordered, delivery containers configured to store products at least partially fulfilling an order, and combined containers including at least one delivery container nested within a storage container.

DEFENDANTS' INFRINGEMENT

52. Defendants have offered to sell, sold, used, made, distributed, and imported into the United States (i) Red Line robots and the Red Line system since at least 2015; (ii) Black Line robots ("B1 Robots") and the Black Line system since at least 2019; (iii) a control system called the Router, for use with the Red Line and Black Line systems, since at least October 2020; and (iv) a "tote-in-tote" feature, for use with the Red Line and Black Line systems, since at least October 2020.

53. As explained in more detail below, (i) Defendants' B1 Robots and Black Line system infringe the '602 Patent; (ii) Defendants' Red Line and Black Line systems infringe the '404 Patent through use of the Router control system; and (iii) Defendants' Red Line and Black Line systems infringe the '080 Patent through use of a "tote-in-tote" feature, which Defendants have advertised specifically to online grocery merchants.

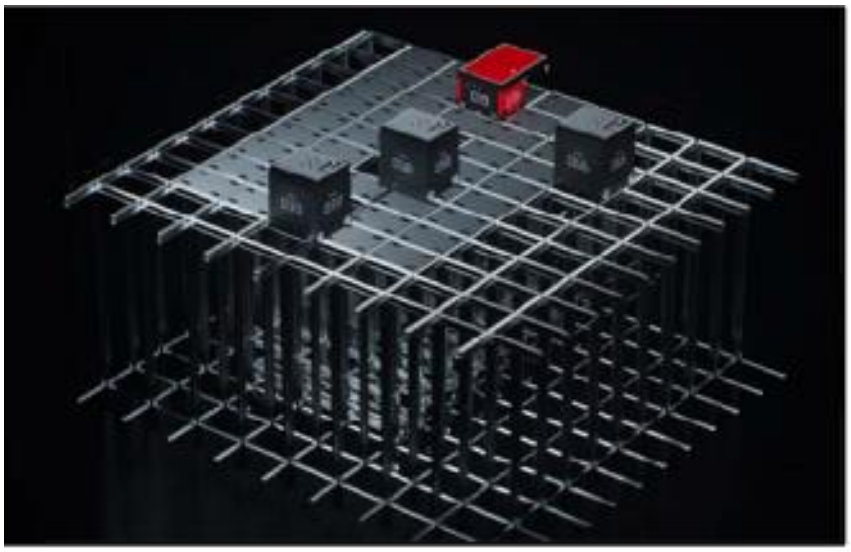
54. The following section describes the main components of Defendants' Red Line and Black Line systems, as relevant to the infringement allegations in this Complaint. The description below focuses on (i) Black Line's modular storage grid, (ii) Black Line's retrieval and storage robot (*i.e.*, B1), (iii) the control system for both the Red Line and Black Line systems (*i.e.*, the Router control system), and (iv) a "tote-in-tote" system for both the Red Line and Black Line systems.[22]

A. Modular Storage Grid – Black Line

55. Defendants' Black Line system includes a cubic storage structure with the top level forming a grid. The structure, as seen below, is formed using vertical support beams, the tops of

[22] The descriptions provided herein are high-level. They are not exhaustive and not intended to replace detailed claim construction positions and infringement or validity contentions, which Plaintiffs will provide at a later date consistent with the Court's Local Rules and Scheduling Order.

which are connected by a horizontal grid made up of two sets of parallel rails—one set of parallel rails in the X-direction perpendicular to the other set in the Y-direction. This structure creates rectangular columns in which storage bins are stacked, and which hold the bins in place.[23]



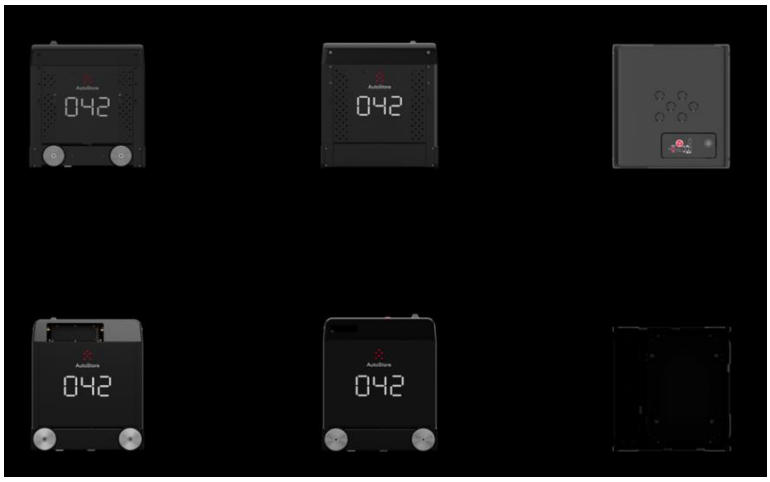
56. The horizontal grid for the Black Line system also includes dual tracks, which Defendants call "double-double" tracks, so the B1 Robots can "pass side-by-side in both the X- and Y-directions."[24]

[23] *See generally* AutoStore, *Grid*, https://autostoresystem.com/grid/ (Ex. 19).

[24] Cribley (Ex. 13).

B. B1 Robots – Black Line

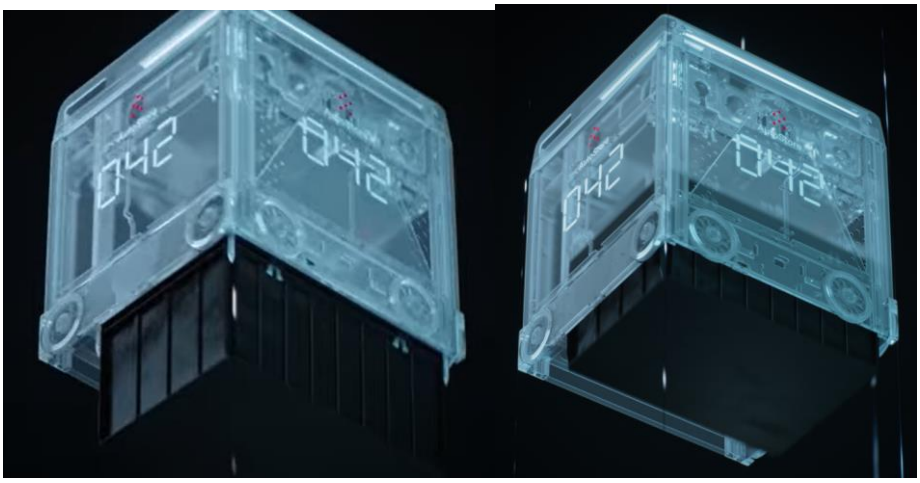
57. The external housing of the B1 robot is shaped substantially as a cuboid, with two side walls in the X-direction, two side walls in the Y-direction, and a top cover in the Z-direction, enclosing the centrally located container-receiving space from above and on all four sides, as seen in the image below. Additionally, "a side of the external housing facing the Y-direction" extends no further than the first set of wheels on that side of the robot, and "a side of the external housing facing the X-direction" extends no further than the second set of wheels on that side of the robot. (Ex. 16, Claim 1.)



58. The B1 Robot moves along the horizontal grid using two wheel assemblies—each comprised of four wheels—arranged perpendicular to one another, as seen above (in the image above, the wheels in the top center view of the robot are located inside the robot body).

59. The B1 Robot has a "cavity" design, pictured below, in which the robot's "container-receiving space" is housed within a centrally located cavity in the robot. To save space, the B1 Robot's "bin lift mechanism is mounted . . . within the robot body"[25]—*i.e.*, the robot uses an internal lifting device to lift bins vertically from the stack below.

[25] Kuecker, *WareHouse Robots by AutoStore*, *available at* https://kuecker.com/pdf/Warehouse-Robots-AutoStore.pdf (Ex. 20).



60. The B1 Robot also occupies substantially a single space on the grid, although not precisely a single space, such that B1 robots occupy a "smaller footprint" than their predecessors and can pass one another in both the X-direction and the Y-direction, as described in paragraph 39 and shown in the accompanying images.[26]

C. The Router – Red Line and Black Line

61. To control the movements of robots, Defendants use a separate system described as "the command center of AutoStore."[27] Its tasks include advanced traffic control; planning and scheduling of tasks; logging bin and robot positions in real time; flexible, configurable alert system; and providing service and support functionality.[28]

62. At least some of Defendants' control systems use the Router, which launched in September and October 2020, as explained above (*supra* ¶¶ 16–18). The Router is compatible with both the Black Line and Red Line systems. In October 2020 marketing materials, Defendants described the Router as software that "continuously" optimizes robot traffic, such that routes are

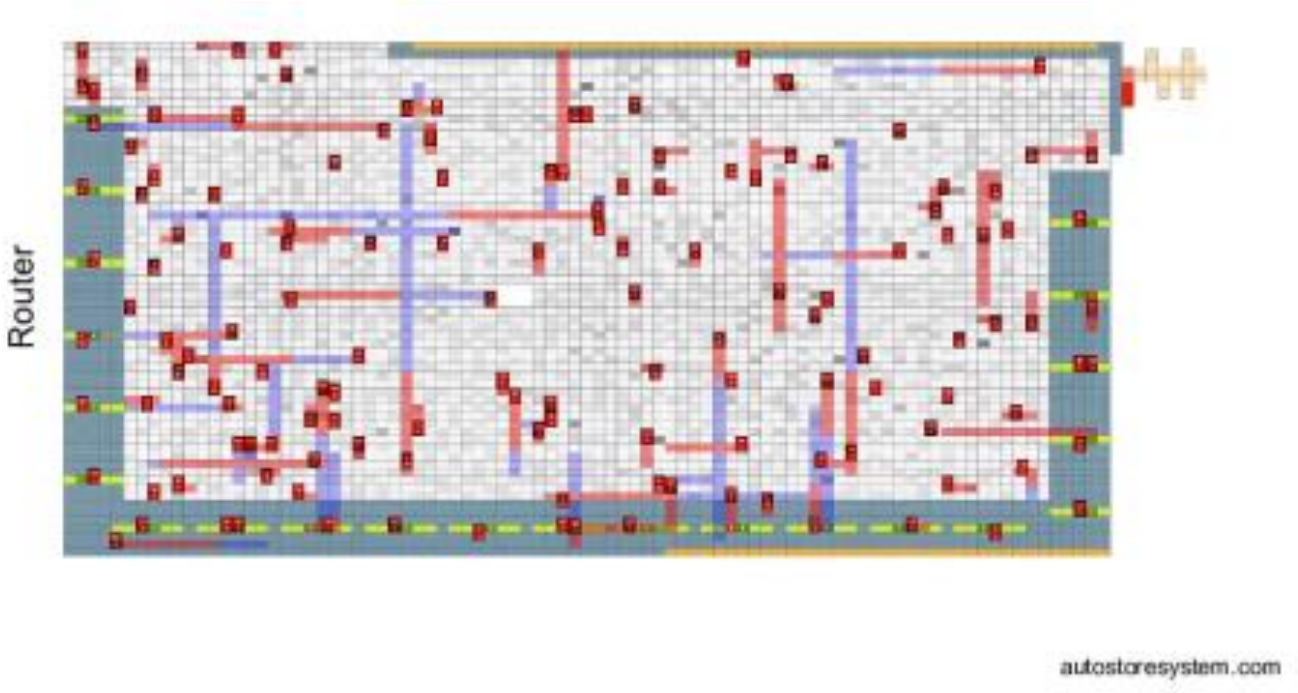
[26] Cribley (Ex. 13).

[27] AutoStore, *Controller*, https://autostoresystem.com/controller/ (Ex. 21).

[28] *Id.*

re-evaluated "[e]very second."[29] In promotional materials, Defendants described the Router as optimizing the Cubic AS/RS system and "working smarter" by, for example, "deciding which robots to use for what job or which route [a] robot should take" to complete its task.[30]

63. On information and belief, the Router conducts sophisticated planning and dynamic re-planning in which each robot has at least a portion of its route planned. The image below, taken from one of Defendants' presentations introducing the Router, depicts routing decisions made by the new control system.[31] The presentation explains that the dark red rectangular boxes represent robots and the blue-shaded routes depict the robots' planned routes.[32]



[29] *AutoStore Introduces Router* (Ex. 14).

[30] AutoStore, *Router Launch*, YouTube (Sept. 29, 2020), https://www.youtube.com/watch?v=L8qNU6INf40, at 6:27, 7:22.

[31] *See* AutoStore, *Online-Pressekonferenz zur neu entwickelten Software-Suite Router*, YouTube (Sept. 29, 2021), https://youtu.be/OzfR3BypU2M, at 14:16–14:42.

[32] *Id*. at 14:29–14:42.

64. The presentation further explains that the robots "cannot cross [the] red . . . blocked areas," which depict the robots' reserved path across the grid.[33] The red-shaded routes represent locations on the grid that have been reserved for a particular robot at a particular time to prevent collisions, among other reasons.

65. Defendants tout Router's ability to "analyze[] and dynamically adapt[] to operational changes,"[34] and thus to "constantly re-evaluat[e] all the routes [that the robots could take] to ensure the best possible traffic flow."[35] In fact, Defendants estimate that by "continuously calculat[ing] and recalculat[ing] the most efficient path for a robot to move in real-time," it can "mak[e] each robot up to 40% more efficient."[36]

D. Tote-in-Tote – Red Line and Black Line

66. In an October 2020 presentation directed to grocery customers, Defendants stated that they could "buffer completed orders into the [Cubic AS/RS] for later shipment."[37] Defendants appear to use, or at least offer, a "tote-in-tote" feature that enables buffering of completed orders into the Cubic AS/RS, which are depicted as the red and black bins in the image below.[38]

[33] *Id*. at 17:55–18:08.

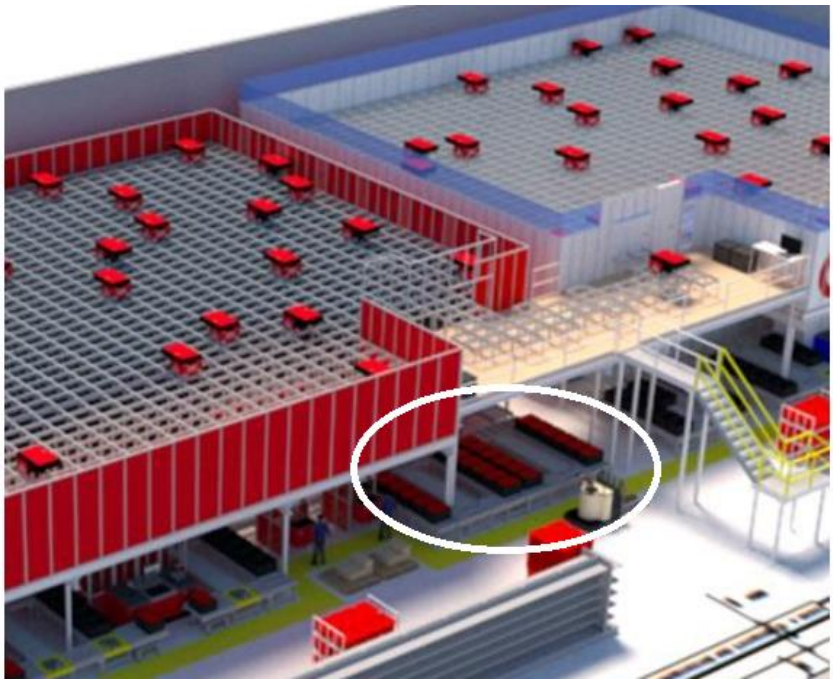
[34] *AutoStore Introduces Router* (Ex. 14).

[35] *Router Launch*, at 7:47–7:50.

[36] AutoStore, *Router*, https://autostoresystem.com/router/ (Ex. 22).

[37] *CS Disruption Series* (Ex. 15).

[38] *See id.*



67. In the image above, the black bins are storage bins and the red bins are delivery bins. As illustrated, a human operator at least partially fills orders and places the delivery bins into storage bins to create the "tote-in-tote" bins, which are circled in white. Defendants then claim to be able to store the "tote-in-tote" bins in the Cubic AS/RS storage grid until the shipment is ready to be loaded and dispatched for delivery.[39] As illustrated above, the "tote-in-tote" bins are removed from the Cubic AS/RS system, and the red delivery bins are then stacked on dollies to be loaded into trucks for delivery to customers (see the bottom portion of the image above, where red delivery bins alone are stacked on a dolly).

68. Both the Red Line and Black Line systems can implement "tote-in-tote" buffering as described above, and at least by October 2020, Defendants were offering this feature to customers in the United States.[40]

[39] *Id.*

[40] *Id.*

DEFENDANTS HAVE WILLFULLY INFRINGED AND CONTINUE TO WILLFULLY INFRINGE THE ASSERTED PATENTS

69. Defendants and Ocado have interacted for nearly a decade, including exploration of a partnership in 2012 through which the companies would co-develop Ocado's inventions related to OSP's Hive. (*Supra* ¶ 7.) Ocado and Defendants were involved in intellectual property litigation in 2016 in Oslo, Norway, in which Ocado alleged that Defendants misappropriated Ocado's inventions related to a central cavity robot (*i.e.*, a robot that would lift storage containers up vertically into a cavity). Before, during, and after that dispute, Ocado made Defendants aware of its patent portfolio related to Cubic AS/RS, including the patented technology asserted in this case.

70. In light of the history between the parties, and the fact that Ocado and AutoStore presently are the only competitors in the Cubic AS/RS market, AutoStore has been (i) aware of the Asserted Patents and (ii) aware that it infringes or likely infringes the Asserted Patents, but has nevertheless continued its unlawful business activities without authorization from Ocado.

71. Defendants' knowledge of Ocado's patented technologies is further supported by the fact that (i) Defendants' submitted third-party observations in connection with Ocado's prosecution of the international patent applications related to the Asserted Patents, and (ii) Defendants have frequently cited Ocado's patents in their own patent applications. Moreover, as alleged in paragraphs 13 through 21 above, the facts and circumstances strongly suggest that Defendants—under private equity ownership—deliberately copied Ocado's patented technologies in order to compete unfairly with Ocado and its business partners.

72. Based on the foregoing, Defendants' infringement of the Asserted Patents has been and continues to be knowing, and Defendants therefore have willfully infringed and continue to willfully infringe the Asserted Patents.

FIRST COUNT
PATENT INFRINGEMENT
'602 PATENT AND BLACK LINE
35 U.S.C. §§ 271 AND 281

73. Plaintiffs incorporate and repeat the preceding paragraphs 1 through 72 above as if fully set forth herein.

74. Defendants have directly infringed one or more claims of the '602 Patent pursuant to 35 U.S.C. §§ 271(a) and 154(d)(1)(A)(i), either literally or under the doctrine of equivalents, by making, using, importing, selling, distributing, and/or offering to sell B1 Robots and the Black Line system in the United States. Defendants' infringement is ongoing.

75. Defendants also have indirectly infringed one or more claims of the '602 Patent pursuant to 35 U.S.C. § 271(b) by actively inducing others (including, but not limited to, their business partners and customers) to infringe the '602 Patent, by, among other things, providing instructions, manuals, technical assistance, and promotional materials relating to the installation, use, operation, and maintenance of B1 Robots and the Black Line system. Defendants' inducement is ongoing.

76. For illustrative purposes only, below is a high level explanation of how Defendants infringe the '602 Patent:

a. The first claim element in Claim 1.

i. This claim element recites:

> 1. A storage system comprising: a first set of parallel rails or tracks extending in an X-direction, and a second set of parallel rails or tracks extending in a Y-direction transverse to the first set of rails or tracks in a substantially horizontal plane to form a grid pattern having a plurality of grid spaces; . . . .

ii. The Black Line system meets this element. As described *supra* ¶¶ 55–56, the Black Line system comprises, in part, a cubic storage structure which has vertical support beams and a top level forming a horizontal grid made

up of two sets of parallel rails—one set of parallel rails in the X-direction perpendicular to the other set in the Y-direction. This creates rectangular columns, or grid spaces.

b. The second claim element in Claim 1.

i. This claim element recites:

> a plurality of stacks of containers located beneath the first and second sets of rails or tracks, and arranged such that each stack is located within a footprint of a single grid space; and . . . .

ii. The Black Line system meets this element. As described *supra* ¶ 55, the cubic storage structure has rectangular columns, in which storage bins are stacked and otherwise held in place.

c. The third claim element in Claim 1.

i. This claim element recites:

> a multiplicity of load handling devices, wherein each load handling device includes[] . . . .

ii. The Black Line system meets this element. The '602 Patent refers to robots as load handling devices. (Ex. 16 ¶ 0026.) And, as described *supra* ¶¶ 56, 60–65, the Black Line system involves the simultaneous use of multiple robots on the storage system.

d. The fourth claim element in Claim 1.

i. This claim element recites:

> a wheel assembly having a first set of wheels for engaging with the first set of rails or tracks to guide device movement in the X-direction and a second set of wheels for engaging with the second set of rails or tracks to guide device movement in the Y-direction, such that each load handling device is configured to selectively move laterally in the X- and Y-directions, above the plurality of stacks on the first and second sets of rails or tracks[] . . . .

ii. The Black Line system meets this element. As described *supra* ¶ 58, the B1 Robot includes two wheel assemblies—each comprised of four wheels—arranged perpendicular to one another so that the robot can travel laterally on the horizontal grid. One assembly is for traveling in the X-direction, and one is for traveling in the Y-direction.

e. The fifth claim element in Claim 1.

i. This claim element recites:

> a container-receiving space arranged to be located above the first and second sets of rails or tracks for accommodating a container when received from the plurality of stacks[] . . . .

ii. The Black Line system meets this element. As described *supra* ¶ 59, the B1 Robot has a centrally located container-receiving space, due to its cavity design. This space is configured to accommodate a bin from the underlying storage system.

f. The sixth claim element in Claim 1.

i. This claim element recites:

> a lifting device arranged to lift the container from a stack of the plurality of stacks into the container-receiving space[] . . . .

ii. The Black Line system meets this element. As described *supra* ¶ 59, the B1 Robot has a "bin lift mechanism [that] is mounted inside to carry bins within the robot body." The bin lifting device lifts bins from the underlying storage system into the centrally located container-receiving space.

g. The seventh claim element in Claim 1.

i. This claim element recites:

> an external housing that is shaped substantially in a cuboid having two sides facing the X-direction, two sides facing the Y-direction, and a top facing a Z-direction, such that the external housing

> substantially encloses the container-receiving space from above and on all four sides of the load handling device, a side of the external housing facing the Y-direction extending no further, in the Y-direction, than the first set of wheels on that side of the load handling device, and a side of the external housing facing the X-direction extending no further, in the X-direction, than the second set of wheels on that side of the load handling device, such that a load handling device of the multiplicity of load handling devices will occupy a grid space and will not obstruct a load handling device of the multiplicity of load handling devices occupying or traversing an adjacent grid space in the X-direction and will not obstruct a load handling device of the multiplicity of load handling devices occupying or traversing an adjacent grid space in the Y-direction.

ii. The Black Line system meets this element. As described *supra* ¶ 57, the B1 Robot is cube-shaped (like a cuboid) and has two side walls facing the X-direction, two side walls facing the Y-direction, and a top facing the Z-direction—enclosing the central cavity from above and on all four sides of the robot.

iii. Additionally, the B1 Robot has "a side" of its external housing facing the Y-direction that extends no further than the wheels on that side, and "a side" of the external housing in the X-direction that extends no further than the second set of wheels on that side.

iv. Finally, as described *supra* ¶ 60, AutoStore has repeatedly described the B1 Robot's "smaller footprint," which allows it to "pass side-by-side in both the x and y directions."

77. Defendants' infringement has been and continues to be willful.

78. Ocado has been and will continue to be irreparably harmed and damaged by Defendants' acts of infringement.

79. Unless enjoined, Defendants will continue to infringe the '602 Patent.

80. As a consequence of the foregoing infringing activities by Defendants, Plaintiffs have been damaged in an amount to be determined at trial.

SECOND COUNT
PATENT INFRINGEMENT
'404 PATENT AND BLACK LINE / RED LINE
35 U.S.C. §§ 271 AND 281

81. Plaintiffs incorporate and repeat the preceding paragraphs 1 through 72 above as if fully set forth herein.

82. Defendants have directly infringed one or more claims of the '404 Patent pursuant to 35 U.S.C. § 271(a), either literally or under the doctrine of equivalents, by making, using, importing, selling, distributing and/or offering to sell the Router in the United States, which is used as part of the Black Line and Red Line systems. Defendants' infringement is ongoing.

83. Defendants also have indirectly infringed one or more claims of the '404 Patent pursuant to 35 U.S.C. § 271(b) by actively inducing others (including, but not limited to, their business partners and customers) to infringe the '404 Patent by, among other things, providing instructions, manuals, technical assistance, and promotional materials relating to the installation, use, operation, and maintenance of the Router in its Black Line and Red Line systems. Defendants' inducement is ongoing.

84. For illustrative purposes only, below is a high-level explanation of how Defendants infringe the '404 Patent:

a. The first claim element in Claim 1.

i. This claim element recites:

> 1. A system for controlling movement of transporting devices arranged to transport containers, the containers being stored in stacks arranged in a facility, the facility having pathways arranged in a grid-like structure above the stacks, the transporting devices being configured to operate on the grid-like structure, the system comprising: . . . .

ii. The Router meets this element. As described *supra* ¶¶ 61–65, AutoStore's Router is designed to control the movement of robots that are arranged to transport bins from one location to another on the cubic storage system.

b. The second claim element in Claim 1.

i. This claim element recites:

> a movement optimisation unit configured to determine a route of a transporting device from one location on a grid-like structure to another location on the grid-like structure for each transporting device; . . . .

ii. The Router meets this element. As described *supra* ¶¶ 61–65, AutoStore's Router is described as optimizing the planning and routing of the robots—specifically, the robots are described as "working smarter." Additionally, the Router software purportedly allows "more than 100X more evaluations for every choice," including "which route that robot should take."

c. The third claim element in Claim 1.

i. This claim element recites:

> a reservation unit configured to reserve a path on the grid-like structure for each transporting device based on the determined route, wherein the path reserved for each transporting device is provided such that no two transporting devices have locations on the grid-like structure which would cause transporting devices to overlap at a same time; and . . . .

ii. The Router meets this element. As described *supra* ¶¶ 61–65, the Router software, on information and belief, includes a module configured to plan and reserve a route for robots operating on the grid. AutoStore has described the Router as "ensur[ing] the best possible traffic flow, always," which necessarily requires that the system map and reserve routes for the

robots so that no two robots occupy the same grid space at the same time, causing a collision.

d. The fourth claim element in Claim 1.

i. This claim element recites:

> a clearance unit configured to provide a clearance instruction for each transporting device to traverse a portion of the reserved path, wherein the clearance instruction is provided for execution by a control unit on each transporting device at a future start time.

ii. With reference to the images and quotations above, *supra* ¶¶ 61–65, the descriptions of how the Router functions lead to a reasonable inference that clearance instructions are provided for execution by a control unit on each robot for execution at a later time. Whether this occurs will need to be examined in discovery.

e. The additional element of Claim 9 (which depends on Claim 1).

i. This claim element recites:

> The system according to Claim 1, wherein at least one of the clearance units, and the movement optimisation unit is configured to dynamically re-plan a route of at least one transporting device.

ii. The Router meets this element. As described *supra* ¶¶ 61–65, AutoStore has repeatedly and publicly stated that Router uses sophisticated algorithms to "continuously calculate *and recalculate* the most efficient path for robot movement *in real-time*." (Emphasis added.) Also that Router is "constantly re-evaluating all the routes to ensure the best possible traffic flow." This indicates that the Router's clearance unit and/or optimization unit is arranged to cause the dynamic re-planning of the robot's route.

85. Defendants' infringement has been and continues to be willful.

86. Ocado has been and will continue to be irreparably harmed and damaged by Defendants' acts of infringement.

87. Unless enjoined, Defendants will continue to infringe the '404 Patent.

88. As a consequence of the foregoing infringing activities by Defendants, Plaintiffs have been damaged in an amount not yet determined.

THIRD COUNT
PATENT INFRINGEMENT
'080 PATENT AND BLACK LINE / RED LINE
35 U.S.C. §§ 271 AND 281

89. Plaintiffs incorporate and repeat the preceding paragraphs 1 through 72 above as if fully set forth herein.

90. Defendants have directly infringed one or more claims of the '080 Patent pursuant to 35 U.S.C. § 271(a), either literally or under the doctrine of equivalents, by making, using, importing, selling, distributing, and/or offering to sell "tote-in-tote" buffering systems (*see supra* ¶¶ 66–68) in the United States as part of the Black Line and Red Line systems.

91. Defendants have indirectly infringed one or more claims of the '080 Patent pursuant to 35 U.S.C. § 271(b) by actively inducing others (including, but not limited to, their business partners and customers) to infringe the '080 Patent by, among other things, providing instructions, manuals, technical assistance, and promotional materials relating to the installation, use, operation, and maintenance of "tote-in-tote" buffering as part of the Black Line and Red Line systems. Defendants' inducement is ongoing.

92. For illustrative purposes only, below is a high-level explanation of how Defendants infringe the '080 Patent:

a. The first claim element in Claim 23.

i. This claim element recites:

23. A system for managing storage and retrieval of containers, comprising: a storage and retrieval system including: . . . .

ii. Both the Black Line and Red Line systems meet this element. As described *supra* ¶¶ 55–65, both systems are automated storage and retrieval systems. Accordingly, both meet this element.

b. The second claim element in Claim 23.

i. This claim element recites:

a structural framework defining a grid of storage locations for receiving a plurality of containers; . . . .

ii. Both the Black Line and Red Line systems meet this element. As described *supra* ¶¶ 55–56, both Cubic AS/RS systems utilize a cubic storage framework with vertical support beams connected at the top by two sets of parallel rails—forming a horizontal grid. The resulting vertical columns are used to stack storage bins.

c. The third claim element in Claim 23.

i. This claim element recites:

a plurality of robotic load handlers each configured to access any one of the storage locations in the grid of the structural framework; and . . . .

ii. Both the Black Line and Red Line systems meet this element. As described *supra* ¶¶ 5, 56–65, both Cubic AS/RS systems involve use of a plurality of robots configured to access the bins stored in the structural framework.

d. The fourth claim element in Claim 23.

i. This claim element recites:

a controller configured to control at least one robotic [handler] in transporting at least one of the plurality of containers to/from any one of the storage locations in the grid, ...

ii. The Black Line and Red Line systems meet this element. As described *supra* ¶¶ 61–65, both Cubic AS/RS systems require a controller configured to control the robots transporting containers to or from any one storage location in the grid. AutoStore uses the Controller, which contains the Router software described *supra* ¶¶ 61–65.

e. The fifth claim element in Claim 23.

i. This claim element recites:

> wherein the plurality of containers includes storage containers configured to store products to be ordered, delivery containers configured to store products at least partially fulfilling an order, and combined containers including at least one delivery container nested within a storage container.

ii. The Black Line and Red Line systems meet this element. As described *supra* ¶¶ 21, 66–68, AutoStore's recent marketing materials reveal that, at least in the context of grocery fulfillment centers, AutoStore uses nested bins that consist of a delivery container within a storage container.

93. Defendants' infringement has been and continues to be willful.

94. Ocado has been and will continue to be irreparably harmed and damaged by Defendants' acts of infringement.

95. Unless enjoined, Defendants will continue to infringe the '080 Patent.

96. As a consequence of the foregoing infringing activities by Defendants, Plaintiffs have been damaged in an amount to be determined at trial.

JURY DEMAND

97. Plaintiffs request a jury trial of all issues in this action so triable.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs request judgment in their favor and relief:

A. Adjudging, finding, and declaring that Defendants have infringed and continue to infringe the Asserted Patents.

B. Adjudging, finding, and declaring that Defendants' infringement has been and continues to be willful.

C. An Order enjoining Defendants from infringing the Asserted Patents, and enjoining Defendants' officers, agents, servants, employees, and those persons in active concert or participation with them, from infringing the Asserted Patents.

D. An Order requiring Defendants, to the extent permitted by contract or law, to (i) retrieve from their business partners and customers any software, robots, or other Cubic AS/RS hardware that is being used as part of an infringing system or being used in an infringing manner, and (ii) instruct their business partners and customers that any software, robots, or other Cubic AS/RS hardware that originated from Defendants or their business partners cannot be used as part of an infringing system or used in an infringing manner.

E. Awarding Plaintiff Ocado Solutions an accounting and lost profits in a sum to be determined at trial.

F. Awarding Plaintiffs compensatory damages in a sum to be determined at trial, but no less than a reasonable royalty pursuant to the Patent Act.

G. Awarding Plaintiffs pre- and post-judgment interest.

H. Awarding Plaintiffs enhanced damages (up to a trebling) in light of Defendants' willful infringement.

I. Awarding Plaintiffs their reasonable attorneys' fees, costs, and disbursements in this action, as allowed by the Patent Act.

J. Granting Plaintiffs such other and further relief as is just and proper.

Date: February 16, 2021

Respectfully submitted,

/s/ Henry C. Quillen .

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